REMARKS

Claims 1-14 remain in this application. Claims 13 and 14 are alternative definitions within the scope of the original claims.

The Office Action objected to the specification on the grounds that the title of the invention is not descriptive. The title of the invention has been amended to overcome the objection. Applicant respectfully requests that this objection be withdrawn.

Claims 11 and 12 were rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. Claims 11 and 12 were amended to overcome this objection. Applicant respectfully requests that this rejection be withdrawn.

The present invention results from the discovery that when creating a composite image from a front image and a back image, the selective filtering of the composite image through an analysis of a front image produces a better composite image. This allows portions of the composite image which overlaps the back image, which has already been filtered, from unnecessarily being re-filtered. Thus, the back image is not unnecessarily deteriorated.

Claims 1-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Betrisey et al.* (U.S. Patent No. 6,738,526, hereinafter "*Betrisey*") in view of *Hill et al.* (U.S. Patent No. 6,577,291, hereinafter "*Hill*").

Independent Claim 1

Betrisey seeks to solve the problem of displaying small sized text on LCDs. It accomplishes this by filtering the glyphs. In general, an application 736 sends a text output 837 including the character, font, and point size information to the glyph cache controller 820. (Col. 11, lns 36-52; Figure 8). The glyph cache controller 822 determines if the exact font and point size of the character is in the glyph cache 820. If, however, the exact point size of the font is not

available, the rasterizer 802 generates a character glyph with the exact point size of the font requested. Rasterizer 802 can also optionally filter the character glyph through filter routine 813, known as pre-cache filtering. The character glyphs generated by the type rasterizer 805 are stored in glyph cache 822 prior to being output under the direction of the glyph cache controller 820. (Col. 11, ln. 60 – Col. 12, ln.65; Figure 9). The glyph display routines 824 then process character glyphs outputted by the glyph cache 822. This can include filtering and is known as post-cache filtering. In post-cache filtering, each sub-pixel is compared with a sub-pixels preceding it and a sub-pixel following it.

In the first embodiment using post-cache filtering, the glyph display routine 824 has available the intermediate alpha values of the glyphs. To get the intermediate alpha values for the glyph, the glyph is sampled 6 times per pixel, or 2 times per sub-pixel as seen in Figures 9 and 10. The 2 values for each sub-pixel is then summed up to produce the intermediate alpha value for each sub-pixel in the glyph. Thus, the glyphs are represented by these intermediate alpha values which are concatenated prior to filtering. Therefore, by the time the filtering is performed, the intermediate alpha values located adjacent to glyph boundaries are defined and available for sue during the filtering process. This prevents color leakage across glyph boundaries. During the filtering process, the preceding and subsequent intermediate alpha value for each sub-pixel is added to the intermediate alpha value for the sub-pixel to produce the filtered alpha values.

In the second embodiment using pre-cache filtering, the filter routine 813 first samples the glyph 6 times per pixel, or 2 times per sub-pixel as seen in Figure 14. The 2 values for each sub-pixel is then summed up to produce the intermediate alpha value for each sub-pixel in the glyph. The glyph is then analyzed to determine if padding is necessary. The glyph is padded to

add background alpha values along each pixel edge where color leakage will occur outside of the glyph as seen in Figure 15. Then each character glyph is filtered. During the filtering process, the preceding and subsequent intermediate alpha value for each sub-pixel is added to the intermediate alpha value for the sub-pixel to produce the filtered alpha values. Then the individual character glyphs are combined. Since some character glyphs may be padded, pixel overlaps may occur. In the case of a character glyph overlap, the three alpha values of the overlapping pixel from each character glyph are summed together to produce three new alpha values for the overlapping pixel.

Thus, one highly relevant inquiry in making an evaluation under 35 U.S.C. §103 is "[t]he relationship between the problem which the inventor. . . was attempting to solve and the problem to which any prior art reference is directed." *Stanley Works v. McKinney Mfg. Co.*, 216 USPQ, 298, 304 (Del. D.C. 1981). Thus, in analyzing the prior art under Section 103 of the Act, we must clearly comprehend the problem addressed by the present inventors and that problem must be compared or contrasted, as the case may be, with the problems addressed by the prior art.

The present invention seeks to solve the problem of color drifting and unnecessary image deterioration when producing a composite image. Thus, an image is displayed by pixels with the pixels further comprising 3 sub-pixels, red, green, and blue. (Spec. pg. 19, lns. 1-4). Each pixel also has an alpha value associated with it which indicates a degree of transparency of a pixel of a front image when the front image is super imposed on a back image. (Spec. pg. 20, lns. 7-19). Each sub-pixel constituting the display screen is assigned a pair of internal processing coordinates (x',y'). The superimposing unit 41 then calculates the color values of a composite image from the color values of the sub-pixels in the front image, the color values of the sub-

pixels in the back image, and the alpha values of the front image. (Spec. pg. 25, ln. 12 – pg. 26 ln. 5). The composite image is then sent to the filtering unit 45.

A front-image change detecting unit 42 shown in our Figures 3 and 4 calculates a dissimilarity level of a sub-pixel to the surrounding sub-pixel for each sub-pixel constituting a front image using a process such as an Euclidean square distance in a color space including alpha values. (Spec. pg. 27, ln. 1-10). Thus, the color value storage unit 51 receives the processing coordinates of 5 sub-pixels: 2 preceding the target sub-pixel, the target sub-pixel, and the 2 following sub-pixels and outputs the calculated Euclidean square distance to the largest color space distance selecting unit 53. The largest color space distance selecting unit 53 selects the largest value of the Euclidean square distances calculated amongst the 5 sub-pixels and outputs that to the filtering necessity judgment unit 43 as the dissimilarity level. The filtering necessity judgment unit 43 then compares the dissimilarity level with a threshold value from the threshold value storage unit 44. If the dissimilarity level for the sub-pixel in the front image is no greater than the threshold value, the filtering necessity judging unit 43 outputs a 0 to the luminance selection unit 64 in the filtering unit 45. If the dissimilarity level is greater than the threshold value, the filtering necessity judging unit 43 outputs a 1 to the luminance selection unit 64 in the filtering unit 45.

A color space conversion unit 61 converts the color values of the R-G-B color space on the composite image received from the superimposing unit 41 into values of the luminance, blue-color-difference, and red-color-difference of a Y-Cb-Cr color space, outputs the luminance values to the luminance filtering unit 63 and outputs the blue-color-difference value and the red-color-difference values to the RGB mapping unit 65. The luminance filtering unit 63 then filters the luminance values of the target sub-pixel at internal processing coordinate (x', y'). The

luminance filtering unit 63 then outputs both the filtered and pre-filtered luminous value to the luminous selection unit 64. The luminous selection unit 64 selects and outputs the filtered luminous value to the RGB mapping unit 65 if it receives a 1 from the filtering necessity judgment unit 43. The luminous selection unit 64 selects and outputs the pre-filtered luminous value to the RGB mapping unit 65 if it receives a 0 from the filtering necessity judgment unit 43.

The RGB mapping unit 65 then calculates the color values of the pixel in the display position coordinate system using the obtained blue-color-difference value and the red-color-difference value of the pixel and using the luminance values of the three consecutive sub-pixels stored in the buffer, thus converting the Y-Cb-Cr color space into the R-G-B color space. In this manner, the display apparatus of the present invention performed the filtering process only on such sub-pixels of the composite image that correspond to sub-pixels of the front image having color values greatly different from adjacent sub-pixels and that are expected to cause color drifts to be observed by the viewers. This reduces the area of the composite image that is filtered by preventing the portions of the composite image that is supplied from the back image from being filtered. This is beneficial because the back image has already been filtered and thus will not be unnecessarily re-filtered and prevents the unnecessary deterioration of the back image. (Spec. pg. 35 ln. 1- pg. 36 ln 1).

The Office Action admits that *Betrisey* does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from color values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit."

The Office Action also admits that *Betrisey* does not teach or suggest "a filtering unit operable to smooth out color values of second-target-range sub-pixels of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels."

Hill aims to solve the problem of aliasing associated with displaying relatively low resolution representations of text. (Col. 4, lns. 40-60). It accomplishes this by exploiting the different intensity contributions by the red pixel, the green pixel, and the blue pixel. For example, in a luminous white pixel, the red pixel contributes approximately 30% of the overall perceived luminance, the green pixel 60%, and the blue pixel 10%. Hill utilizes the individual pixel sub-components of a display as independent luminous intensity sources to increase the effective resolution of a display. (Col. 5 lns. 4-15). This is done by a weighted scan conversion. To do this, *Hill*, utilizes an image 1002 which is scaled by a factor of 10 in the vertical direction and by a factor of 1 in the horizontal direction, as seen in Figure 14, each pixel comprises 10 segments. Now, the first 3 segments are devoted to determining the luminosity intensity value of the red sub-pixel, the next 6 to the green sub-pixel, and the last 1 to the blue sub-pixel. (Col. 17, ln. 29 – Col. 18, ln. 5).

However, after this weighted scan conversion is completed, the pixel color processing sub-routine 970 in Figure 9C or sub-routine 990 in 9D are used to determine if the luminous intensity values of the CURRENT PIXEL should be adjusted to reduce or eliminate color artifacts and to make such adjustments as required. (Col. 20 lns. 40-45).

In sub-routine 970 displayed in Figure 9C, only the CURRENT PIXEL is analyzed, independent of any other pixels in the foreground or background. (Col. 21, lns 16-18). Since the blue sub-pixel has only a third of the potential luminous intensity of the red sub-pixel, and only

one-sixth that of the green sub-pixel, the blue sub-pixel is not considered at all. Instead, only the luminous intensity values of the red and green sub-pixels are compared with each other. If the absolute differential between the luminance intensity value of the red sub-pixel and the luminance intensity value of the green sub-pixel differs by a greater margin than a pre-set threshold, the luminance intensity value of the green sub-pixel and red sub-pixel are changed to reduce the differential. If the absolute differential between the luminance intensity value of the red sub-pixel and the luminance intensity value of the green sub-pixel differs by a greater margin than a pre-set threshold, the luminance intensity value of the green sub-pixel and red sub-pixel are maintained. (Col. 21, ln. 45 – Col. 22, ln. 33). The rationale is that pixels which are likely to distract are those pixels in which the luminance intensity value of the red sub-pixel and the luminance intensity value of the green sub-pixel differ by a huge margin. (Col. 21, lns. 34 – 41).

In sub-routine 990 displayed on Figure 9D, the CURRENT PIXEL is compared with the pixel in the front image and the back image. If the difference is greater than a pre-selected acceptable range, the color of the CURRENT PIXEL is adjusted towards the range of acceptable colors. This may involve modifying one or more of the red, blue, or green sub-pixels.

Hill does not teach or suggest "a filtering unit operable to smooth out color values of second-target-range of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels." In sub-routine 970 in *Hill*, a single pixel called CURRENT PIXEL has its luminance intensity value of the red pixel and green pixel analyzed. If the luminance intensity values of those two are different by a sufficient margin, the CURRENT PIXEL is then itself modified. However, in the present invention, the filtering unit analyzes the pixel in the front image, and if the dissimilarity level is too high, modifies the pixel in a

composite image that corresponds to the analyzed pixel in the front unit. Thus, in the present invention, one pixel is analyzed, and another pixel modified whereas in the sub-routine 970 in Hill, a single pixel is analyzed and modified. Furthermore, in sub-routine 990 in *Hill*, the pixels in the front and back image are compared to the CURRENT PIXEL to determine if the color of the CURRENT PIXEL is acceptable.

In contrast, the present invention only analyzes the pixels from the front image to determine if the composite image needs to be filtered. The pixels from the front image are not compared to the composite image and the pixels from the composite image are not compared to the front image or the back image. This analysis of only the pixels in the front image prevents the filtering of the portions of the composite image that are contributed by the back image since the back image has already been filtered. This in turn prevents image deterioration in the portions of the composite image that are contributed to by the back image.

Hill also does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from color values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit."

In sub-routine 970 in Hill, only the red and green sub-pixels are compared to each other. As can be seen in Figures 12A and 12B, the red and green sub-pixels are not adjacent to each other in a lengthwise direction of the pixel rows. Where there is a top to bottom configuration of the red, green, and blue sub-pixel for a pixel, the length wise direction is to the right and left of the pixel. Where there is a left to right configuration of the red, green, and blue sub-pixel for a pixel, the length wise direction is to the top and bottom of the pixel. Thus, in both figures 12A

and 12B where there are alternate configurations of the red, green, and blue sub-pixels within a pixel, the red and green pixel are not adjacent to each other in a lengthwise direction of the pixel row.

In contrast, as can be seen in Figure 4 of the present invention, the red sub-pixel of a pixel is adjacent to a red sub-pixel of another pixel in a lengthwise direction of the pixel row. This is also seen in the specification where the space distance calculating unit 52 calculates the Euclidian square distance of the five sub-pixels by comparing a red sub-pixel with a red sub-pixel, a green sub-pixel with a green sub-pixel, and a blue sub-pixel with a blue sub-pixel.

In sub-routine 990 in *Hill*, the CURRENT PIXEL is compared to the pixel in the front image and the back image. (Col. 23, lns 60-66). However, in the present invention, the sub-pixels in the front image are compared to adjacent sub-pixels in the front image. Thus, the CURRENT PIXEL in Hill is compared as a whole to pixels in other images and is different from the present invention.

There is also no motivation to combine *Betrisey* and *Hill*.

In *Orthopedic Co., Inc. v. United States*, 217 USPQ 193 (C.A.F.C. 1983), the Federal Circuit set forth a useful guide for determining the scope and content of the prior art. Orthopedic, at pages 196-197, also focuses on the "problem" faced by the inventors:

> In determining the relevant art. . . one looks at the nature of the problem confronting the inventor.
>
> * * *
>
> [W]ould it then be <u>nonobvious</u> to this person of ordinary skill in the art to <u>coordinate these elements in the same manner as the claims</u> in suit? The difficulty which attaches to all honest attempts to answer this question can be attributed to the <u>strong temptation to rely on hindsight</u> while undertaking this evaluation. It is wrong to use the patent in suit [the patent application before the Examiner] as a guide through the maze of prior art references, combining the right references in the right way so as to achieve

> the result of the claims in suit. Monday morning quarterbacking is quite improper when resolving the question of nonobviousness. (Emphasis added)

However, even if the two references were combined, however improperly, the hypothetical combination would still not produce the present invention. The hypothetical combination would be a display apparatus that created a composite image that is filtered only through the analysis of only the red sub-pixel and green sub-pixel on the composite image. It would not determine whether certain portions of a composite image should be filtered through the analysis of the sub-pixels adjacent to each other in a lengthwise direction to pixel rows in the frontal image.

Independent Claim 5

The Office Action also admits that *Betrisey* does not teach or suggest "a filtering unit operable to smooth out color values of second-target-range sub-pixels of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels."

The Office Action cites *Betrisey* for teaching "transparency values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit," however, *Betrisey* does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from at least one of (i) color values and (ii) transparency values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit." However, unlike the present invention, the alpha values in *Betrisey* were not used to calculate a

dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows.

Hill does not teach or suggest "a filtering unit operable to smooth out color values of second-target-range of the composite image that correspond to the first-target-range sub-pixels, by assigning weights, which are determined in accordance with the dissimilarity level, to the second-target-range sub-pixels." In sub-routine 970 in *Hill*, a single pixel called CURRENT PIXEL has its luminance intensity value of the red pixel and green pixel analyzed. If the luminance intensity values of those two are different by a sufficient margin, the CURRENT PIXEL is then itself modified. However, in the present invention, the filtering unit analyzes the pixel in the front image, and if the dissimilarity level is too high, modifies the pixel in a composite image that corresponds to the analyzed pixel in the front unit. Thus, in the present invention, one pixel is analyzed, and another pixel modified whereas in the sub-routine 970 in Hill, a single pixel is analyzed and modified.

Furthermore, in sub-routine 970 in Hill, the pixels in the front and back image are compared to the CURRENT PIXEL to determine if the color of the CURRENT PIXEL is acceptable. In contrast, the present invention only analyzes the pixels from the front image to determine if the composite image needs to be filtered. The pixels from the front image are not compared to the composite image and the pixels from the composite image are not compared to the front image or the back image. This analysis of only the pixels in the front image prevents the filtering of the portions of the composite image that are contributed by the back image since the back image has already been filtered. This in turn prevents image deterioration in the portions of the composite image that are contributed to by the back image.

Hill also does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows, from at least one of (i) color values and (ii) transparency values of first-target-range sub-pixels composed of the target sub-pixel and the one or more adjacent sub-pixels stored in the front image storage unit."

In sub-routine 970 in Hill, only the red and green sub-pixels are compared to each other. As can be seen in Figures 12A and 12B, the red and green sub-pixels are not adjacent to each other in a lengthwise direction of the pixel rows. Where there is a top to bottom configuration of the red, green, and blue sub-pixel for a pixel, the length wise direction is to the right and left of the pixel. Where there is a left to right configuration of the red, green, and blue sub-pixel for a pixel, the length wise direction is to the top and bottom of the pixel. Thus, in both figures 12A and 12B where there are alternate configurations of the red, green, and blue sub-pixels within a pixel, the red and green pixel are not adjacent to each other in a lengthwise direction of the pixel row. In contrast, as can be seen in Figure 4 of the present invention, the red sub-pixel of a pixel is adjacent to a red sub-pixel of another pixel in a lengthwise direction of the pixel row. This is also seen in the specification where the space distance calculating unit 52 calculates the Euclidian square distance of the five sub-pixels by comparing a red sub-pixel with a red sub-pixel, a green sub-pixel with a green sub-pixel, and a blue sub-pixel with a blue sub-pixel.

In sub-routine 990 in *Hill*, the CURRENT PIXEL is compared to the pixel in the front image and the back image. (Col. 23, lns 60-66). However, in the present invention, the sub-pixels in the front image are compared to adjacent sub-pixel in the front image. Thus, the CURRENT PIXEL in Hill is compared as a whole to pixels in other images and is different from the present invention.

There is no indication that *Hill* uses transparency value at all to "calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows." *Hill* does not contemplate that there may be dissimilarity level based solely on the frontal image that may impact the composite image. The ability to calculate a dissimilarity level based on transparency value in the frontal image in the present invention provides additional smoothing out for edges that were caused to the difference in the degree of transparency as opposed to color values. This provides a better composite image.

There is also no motivation to combine *Betrisey* and *Hill*. Neither reference seeks to solve the present problem, image deterioration. However, even if the two references were combined, however improperly, the hypothetical combination would still not produce the present invention. The hypothetical combination would be a display apparatus that created a composite image that is filtered only through the analysis of only the red sub-pixel and green sub-pixel on the composite image. It would not determine whether certain portions of a composite image should be filtered through the analysis of the color values and/or transparency values of sub-pixels adjacent to each other in a lengthwise direction to pixel rows in the frontal image.

Thus, the present invention has novelty and inventiveness over *Betrisey* in view of *Hill*.

Independent Claims 9 and 11

The arguments for patentability with respect to Claim 1 is repeated and incorporated herein. Thus, the present invention has novelty and inventiveness over *Betrisey* in view of *Hill*.

Independent Claims 10 and 12

The arguments for patentability with respect to Claim 5 is repeated and incorporated herein. Thus, the present invention has novelty and inventiveness over *Betrisey* in view of *Hill*.

Independent Claim 13

Betrisey does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of the target sub-pixel and at least one second sub-pixel using the first color value and the second color value." The invention in *Betrisey* does not calculate the dissimilarity level of a target sub-pixel and at least one second sub-pixel at all as defined in Claim 13.

Betrisey also does not teach or suggest a "a filtering unit operable to smooth out the color value of the third sub-pixel, by assigning a weight to the color value of the third sub-pixel, wherein the weight is determined in accordance with the dissimilarity level." The invention in *Betrisey* does not smooth out the color value of the third sub-pixel by assigning a weight which is determined by the dissimilarity level since *Betrisey* does not utilize a dissimilarity level at all.

Hill also does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of the target sub-pixel and at least one second sub-pixel using the first color value and the second color value." In sub-routine 970, *Hill* calculates any dissimilarity level of the target sub-pixel through comparison of red and green sub-pixels within the same pixel. However, the present invention uses a "target sub-pixel emitting a primary color in the front image with a first color value associated with it" and a "a second sub-pixel emitting the same primary color as the target sub-pixel with a second color value associated with it" to calculate a dissimilarity level. Thus, unlike the invention in *Hill*, the present invention calculates the dissimilarity level with sub-pixels emitting the same color.

In sub-routine 990, *Hill* calculates the dissimilarity level through analysis of the CURRENT PIXEL to a pixel in the front image and/or the back image. In the present invention, however, the dissimilarity level is calculated by analyzing the target sub-pixel in the front image with adjacent target sub-pixels in the front image. Thus, unlike the present invention Hill uses

pixels as opposed to sub-pixels and furthermore compares the pixel on the composite image to pixels in the front and/or back image as opposed to analyzing them only on the front image.

Hill also does not teach or suggest "a filtering unit operable to smooth out the color value of the third sub-pixel, by assigning a weight to the color value of the third sub-pixel, wherein the weight is determined in accordance with the dissimilarity level." In one embodiment, Hill analyzes the CURRENT PIXEL and then modifies the CURRENT PIXEL. This is different from the present invention because the target pixel is analyzed and the third pixel is modified. Thus, the present invention uses two different pixels for analysis and modification. In another embodiment, *Hill* analyzes the CURRENT PIXEL with a pixel in the front image and a pixel in the back image. This is different from the present invention because the target pixel is located in the front image and furthermore is analyzed with adjacent pixels in the front image. The target pixel is not compared to the back image or the composite image.

There is also no motivation to combine *Betrisey* and *Hill*. Neither reference seeks to solve the present problem, image deterioration. However, even if the two references were combined, however improperly, the hypothetical combination would still not produce the present invention. The hypothetical combination would be a display apparatus that created a composite image that is filtered only through the analysis of only the red sub-pixel and green sub-pixel on the composite image. It would not determine whether certain portions of a composite image should be filtered through the analysis of the color values of sub-pixels adjacent to each other in a lengthwise direction to pixel rows in the frontal image.

Thus, the present invention has novelty and inventiveness over *Betrisey* in view of *Hill*.

Independent Claim 14

Beatrisey does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of the target sub-pixel and at least one second sub-pixel using at least one of (i) the first color value and the second color value or (ii) the first transparency value and the second transparency value." The invention in *Betrisey* does not calculate the dissimilarity level of a target sub-pixel and at least one second sub-pixel at all.

Betrisey also does not teach or suggest a "a filtering unit operable to smooth out the color value of the third sub-pixel, by assigning a weight to the color value of the third sub-pixel, wherein the weight is determined in accordance with the dissimilarity level." The invention in *Betrisey* does not smooth out the color value of the third sub-pixel by assigning a weight which is determined by the dissimilarity level since *Betrisey* does not utilize a dissimilarity level at all.

Hill does not teach or suggest "a calculation unit operable to calculate a dissimilarity level of the target sub-pixel and at least one second sub-pixel using at least one of (i) the first color value and the second color value or (ii) the first transparency value and the second transparency value." In sub-routine 970, *Hill* calculates any dissimilarity level of the target sub-pixel through comparison of red and green sub-pixels within the same pixel. However, the present invention uses a "target sub-pixel emitting a primary color in the front image with a first color value associated with it" and a "a second sub-pixel emitting the same primary color as the target sub-pixel with a second color value associated with it" to calculate a dissimilarity level. Thus, unlike the invention in *Hill*, the present invention calculates the dissimilarity level with sub-pixels emitting the same color.

In sub-routine 990, *Hill* calculates the dissimilarity level through analysis of the CURRENT PIXEL to a pixel in the front image and/or the back image. In the present invention,

however, the dissimilarity level is calculated by analyzing the target sub-pixel in the front image with adjacent target sub-pixels in the front image. Thus, unlike the present invention Hill uses pixels as opposed to sub-pixels and furthermore compares the pixel on the composite image to pixels in the front and/or back image as opposed to analyzing them only on the front image.

There is also no indication that *Hill* uses transparency value at all to "calculate a dissimilarity level of a target sub-pixel to one or more sub-pixels that are adjacent to the target sub-pixel in the lengthwise direction of the pixel rows." *Hill* does not contemplate that there may be dissimilarity level based solely on the frontal image that may impact the composite image. The ability to calculate a dissimilarity level based on transparency value in the frontal image in the present invention provides additional smoothing out for edges that were caused to the difference in the degree of transparency as opposed to color values. This provides a better composite image.

Hill also does not teach or suggest "a filtering unit operable to smooth out the color value of the third sub-pixel, by assigning a weight to the color value of the third sub-pixel, wherein the weight is determined in accordance with the dissimilarity level." In one embodiment, Hill analyzes the CURRENT PIXEL and then modifies the CURRENT PIXEL. This is different from the present invention because the target pixel is analyzed and the third pixel is modified. Thus, the present invention uses two different pixels for analysis and modification. In another embodiment, *Hill* analyzes the CURRENT PIXEL with a pixel in the front image and a pixel in the back image. This is different from the present invention because the target pixel is located in the front image and furthermore is analyzed with adjacent pixels in the front image. The target pixel is not compared to the back image or the composite image. These features are set forth in Claim 14.

There is also no motivation to combine *Betrisey* and *Hill*. Neither reference seeks to solve the present problem, image deterioration. However, even if the two references were combined, however improperly, the hypothetical combination would still not produce the present invention. The hypothetical combination would be a display apparatus that created a composite image that is filtered only through the analysis of only the red sub-pixel and green sub-pixel on the composite image. It would not determine whether certain portions of a composite image should be filtered through the analysis of the color values and/or transparency values of sub-pixels adjacent to each other in a lengthwise direction to pixel rows in the frontal image.

Thus, the present invention has novelty and inventiveness over *Betrisey* in view of *Hill*.

Dependent Claims 2-4 and 6-8

Dependent claims 2-4 and 6-8 more clearly define and narrow the scope of independent claims 1 and 5. Therefore, they are patentable.

The application now only contains allowable subject matter, and accordingly, it is believed it is in condition for allowance.

If there are any questions with regards to this response, the undersigned attorney can be contacted at the listed phone number.

Very truly yours,

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